SIPMOS® Small-Signal-Transistor

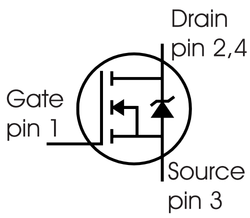
Feature

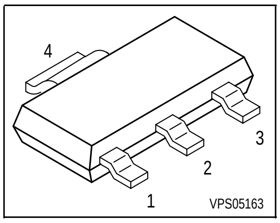
- N-Channel
- Enhancement mode
- dv/dt rated
- Pb-free lead plating; RoHS compliant

Product Summary

V_{DS}	60	V
$R_{DS(on)}$	0.3	Ω
I_D	1.8	A

PG-SOT-223





Type	Package	Tape and Reel Information	Marking
BSP295	P-SOT-223	E6327	BSP295
BSP295	PG-SOT-223	L6327	BSP295

Maximum Ratings, at T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Value	Unit
Continuous drain current	I_D		A
T_A=25°C		1.8	
T_A=70°C		1.44	
Pulsed drain current T_A=25°C	$I_{D\ puls}$	7.2	
Reverse diode dv/dt I_S=1.8A, V_{DS}=40V, di/dt=200A/µs, T_{jmax}=150°C	dv/dt	6	kV/µs
Gate source voltage	V_{GS}	±20	V
ESD Sensitivity (HBM) as per MIL-STD 883		Class 1	
Power dissipation T_A=25°C	P_{tot}	1.8	W
Operating and storage temperature	T_j , T_{stg}	-55... +150	°C
IEC climatic category; DIN IEC 68-1		55/150/56	

Thermal Characteristics

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Characteristics					
Thermal resistance, junction - soldering point	R_{thJS}	-	15	25	K/W
SMD version, device on PCB:	R_{thJA}				
@ min. footprint		-	80	115	
@ 6 cm^2 cooling area [1)]		-	48	70	

Electrical Characteristics, at T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Drain-source breakdown voltage V_{GS}=0, I_D=250µA	$V_{(BR)DSS}$	60	-	-	V
Gate threshold voltage, $V_{GS} = V_{DS}$ I_D=400µA	$V_{GS(th)}$	0.8	1.1	1.8	
Zero gate voltage drain current	I_{DSS}				µA
V_{DS}=60V, V_{GS}=0, T_j=25°C		-	-	0.1	
V_{DS}=60V, V_{GS}=0, T_j=150°C		-	8	50	
Gate-source leakage current V_{GS}=20V, V_{DS}=0	I_{GSS}	-	1	10	nA
Drain-source on-state resistance	$R_{DS(on)}$				Ω
V_{GS}=10V, I_D=1.8A		-	0.22	0.3	
V_{GS}=4.5V, I_D=1.8A		-	0.39	0.5	

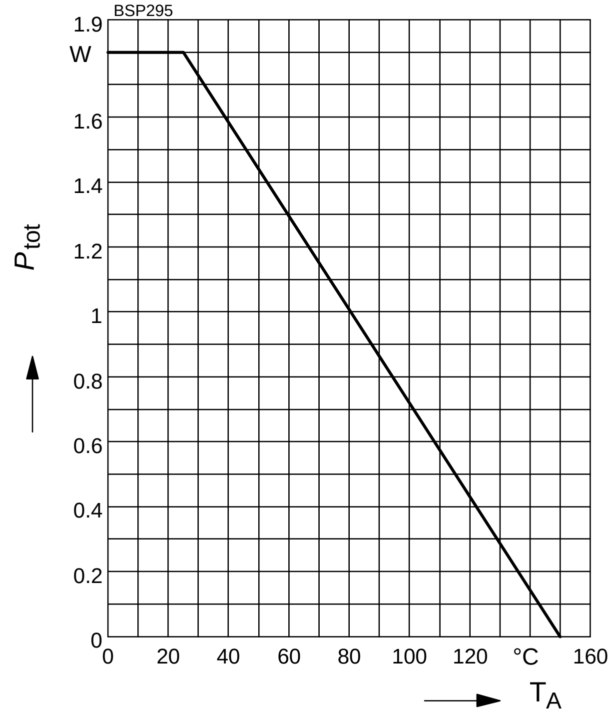
[1]Device on 40mm*40mm*1.5mm epoxy PCB FR4 with 6cm² (one layer, 70 µm thick) copper area for drain connection. PCB is vertical without blown air.

Electrical Characteristics, at T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Dynamic Characteristics						
Transconductance	g_{fs}	V_{DS}≥2*I_D*$R_{DS(on)max}$, I_D=1.44A	0.8	1.7	-	S
Input capacitance	C_{iss}	V_{GS}=0, V_{DS}=25V, *f*=1MHz	-	295	368	pF
Output capacitance	C_{oss}		-	95	118	
Reverse transfer capacitance	C_{rss}		-	45	67	
Turn-on delay time	$t_{d(on)}$	V_{DD}=15V, V_{GS}=4.5V, I_D=1.44 A, R_G=15Ω	-	5.4	8.1	ns
Rise time	t_r		-	9.9	15	
Turn-off delay time	$t_{d(off)}$		-	27	41	
Fall time	t_f		-	19	28	
Gate Charge Characteristics						
Gate to source charge	Q_{gs}	V_{DD}=24V, I_D=1.8A	-	0.9	1.1	nC
Gate to drain charge	Q_{gd}		-	5.6	8.4	
Gate charge total	Q_g	V_{DD}=24V, I_D=1.8A, V_{GS}=0 to 10V	-	14	17	
Gate plateau voltage	$V_{(plateau)}$	V_{DD}=24V, I_D = 1.8 A	-	3.1	3.8	V
Reverse Diode						
Inverse diode continuous forward current	I_S	T_A=25°C	-	-	1.8	A
Inv. diode direct current, pulsed	I_{SM}		-	-	7.2	
Inverse diode forward voltage	V_{SD}	V_{GS}=0, I_F = I_S	-	0.84	1.3	V
Reverse recovery time	t_{rr}	V_R=25V, I_F=I_S, di_F/dt=100A/µs	-	36	45	ns
Reverse recovery charge	Q_{rr}		-	38	48	nC

1 Power dissipation

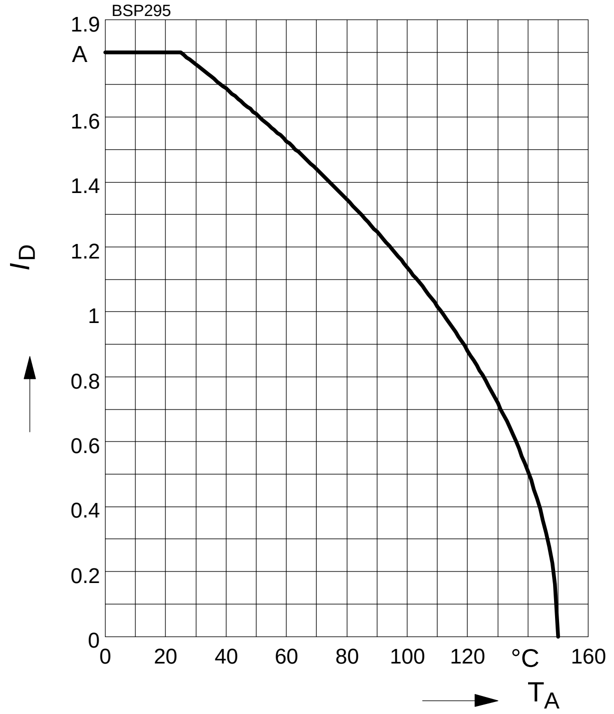
$P_{tot} = f(T_A)$



2 Drain current

$I_D = f(T_A)$

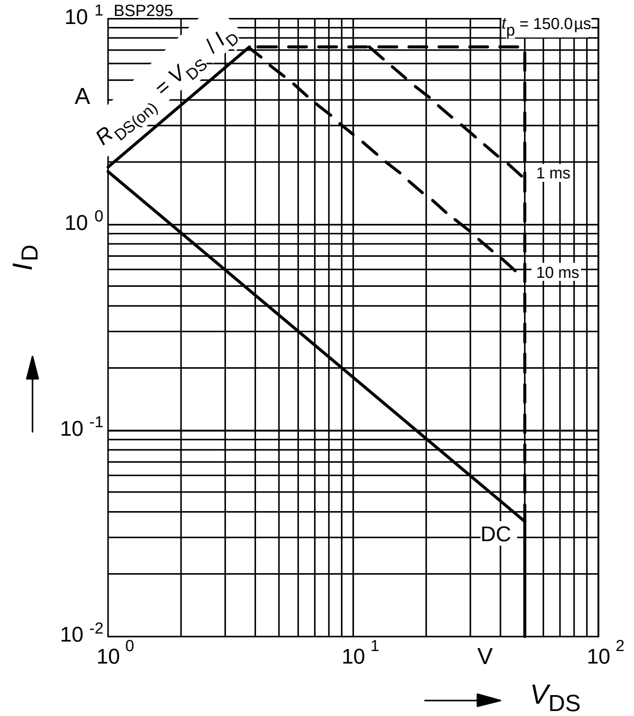
parameter: $V_{GS} \geq 10$ V



3 Safe operating area

$I_D = f(V_{DS})$

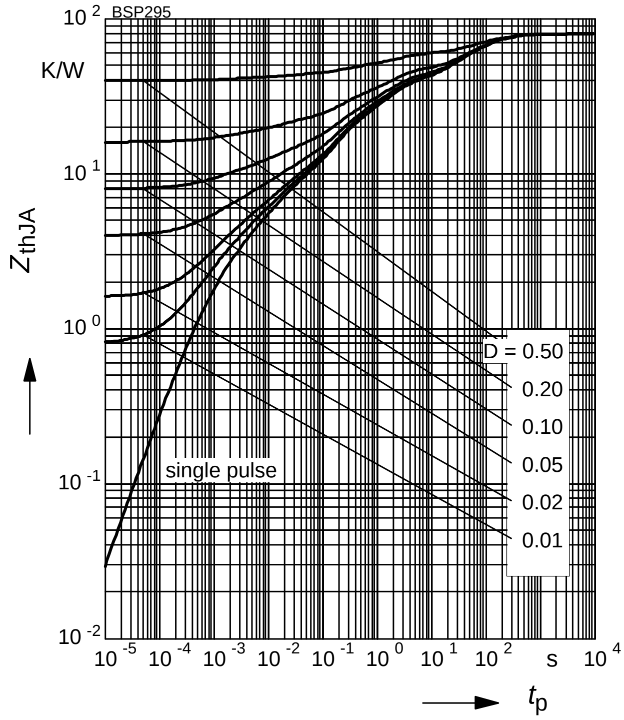
parameter : $D = 0$, $T_A = 25$ °C



4 Transient thermal impedance

$Z_{thJA} = f(t_p)$

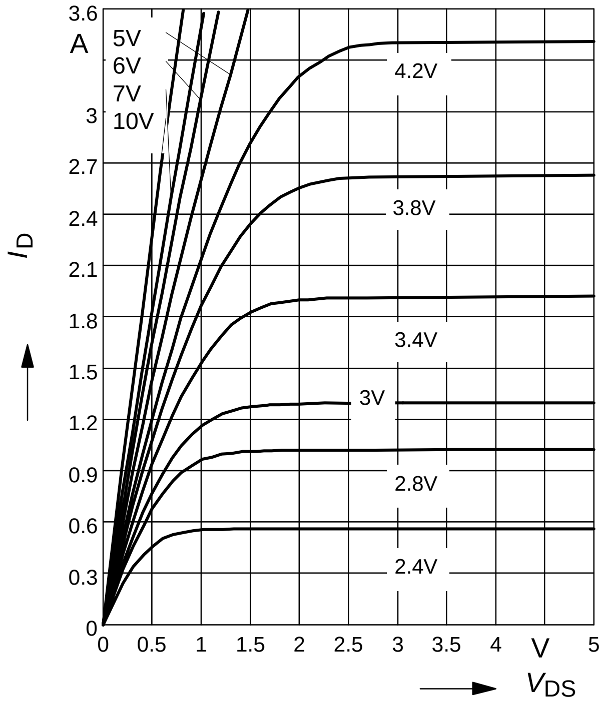
parameter : $D = t_p/T$



5 Typ. output characteristic

$I_D = f\,(V_{DS})$

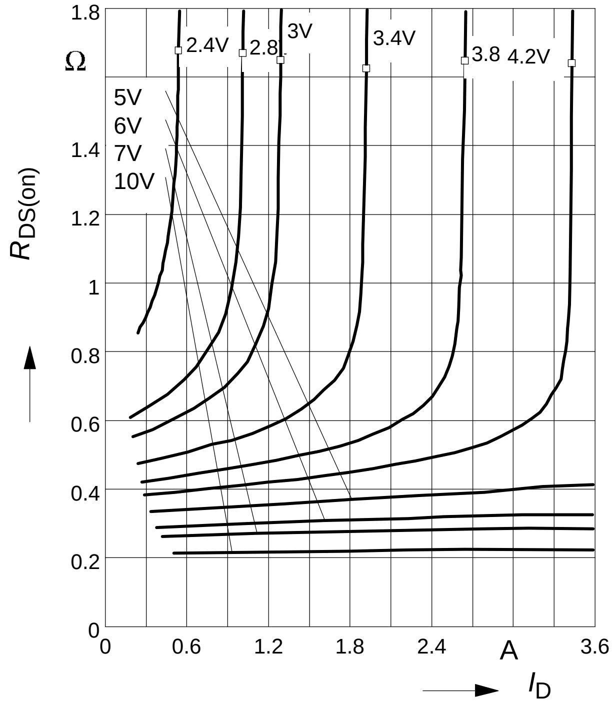
parameter: T_j = 25 °C, V_{GS}



6 Typ. drain-source on resistance

$R_{DS(on)} = f\,(I_D)$

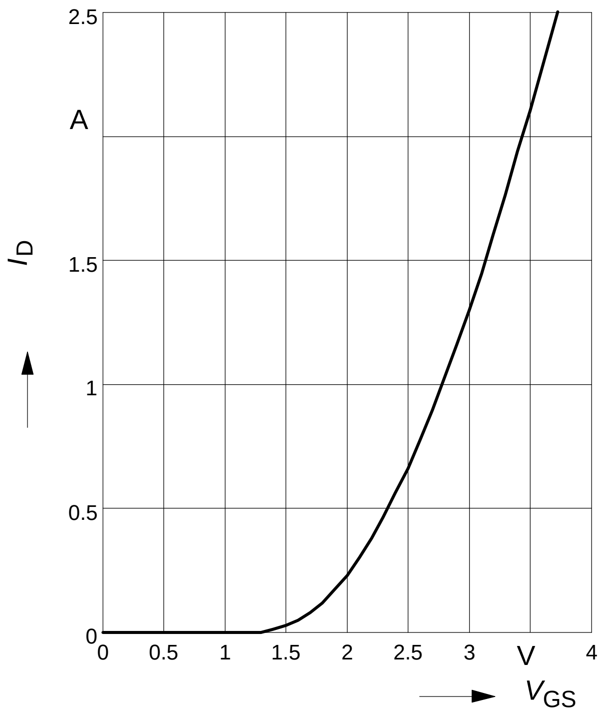
parameter: T_j = 25 °C, V_{GS}



7 Typ. transfer characteristics

$I_D = f\,(V_{GS})$; $V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$

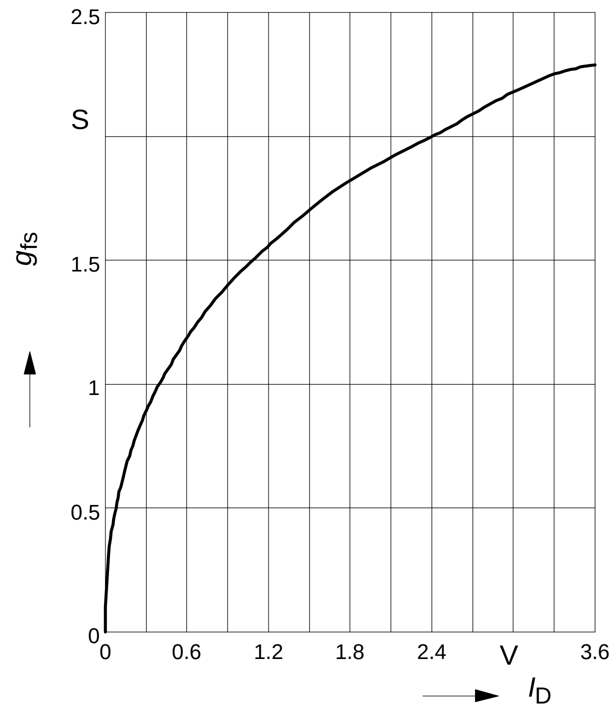
parameter: T_j = 25 °C



8 Typ. forward transconductance

$g_{fs} = f(I_D)$

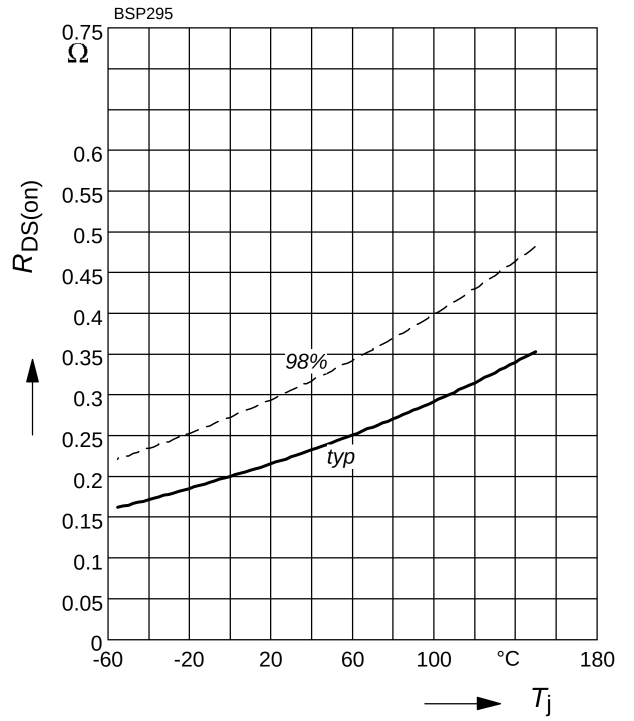
parameter: T_j = 25 °C



9 Drain-source on-state resistance

$R_{DS(on)} = f\,(T_j)$

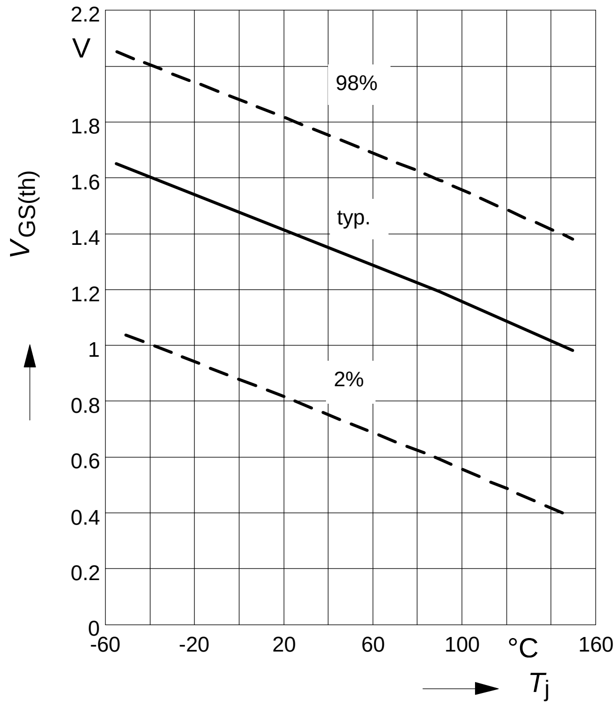
parameter : I_D = 1.8 A, V_{GS} = 10 V



10 Typ. gate threshold voltage

$V_{GS(th)} = f\,(T_j)$

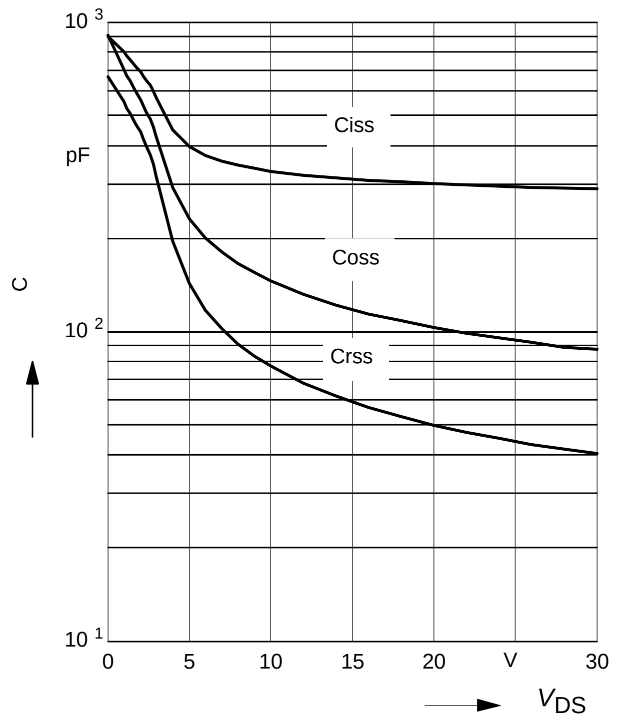
parameter: $V_{GS} = V_{DS}$; I_D = 1 mA



11 Typ. capacitances

$C = f\,(V_{DS})$

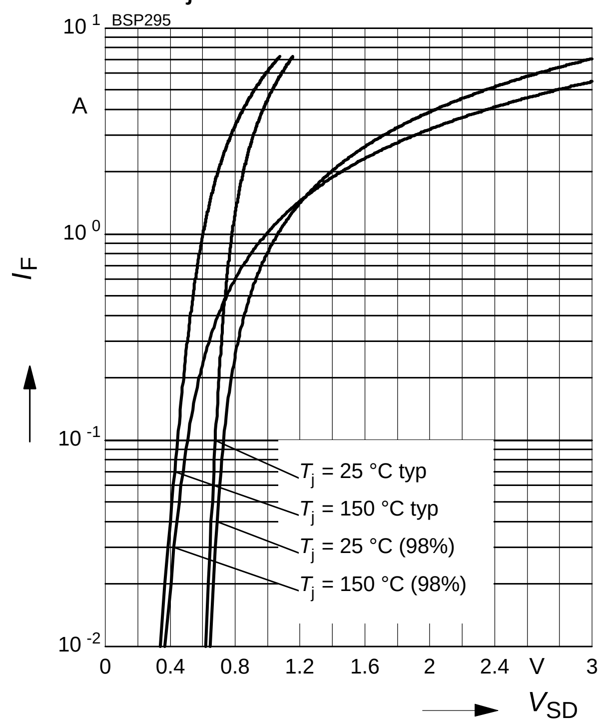
parameter: V_{GS}=0, f=1 MHz, T_j = 25 °C



12 Forward character. of reverse diode

$I_F = f\,(V_{SD})$

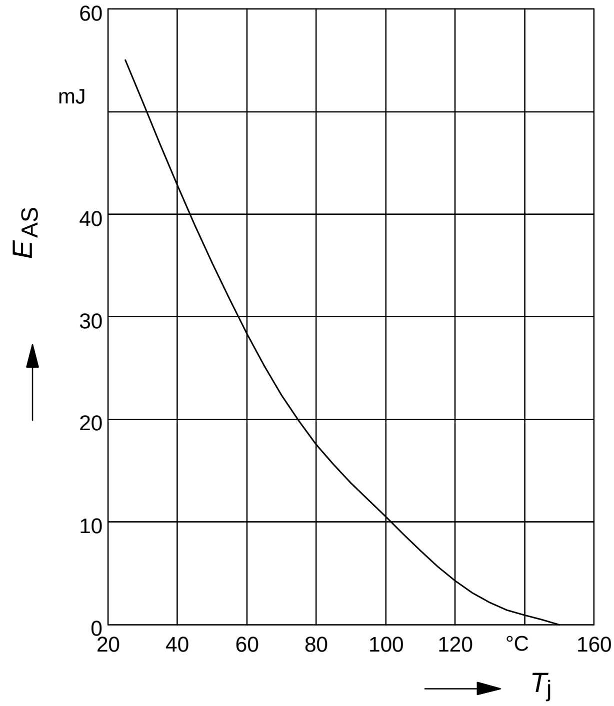
parameter: T_j



13 Typ. avalanche energy

$E_{AS} = f\,(T_j)$

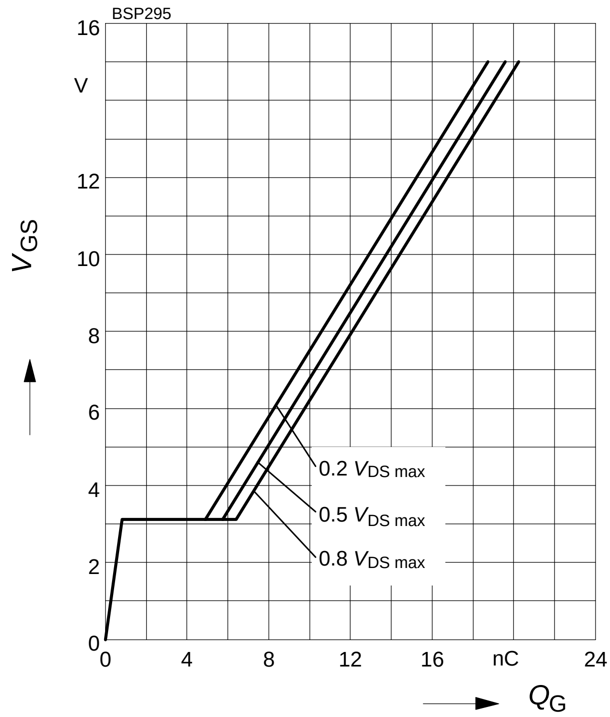
par.: I_D = 3.9 A, V_{DD} = 25 V, R_{GS} = 25 Ω



14 Typ. gate charge

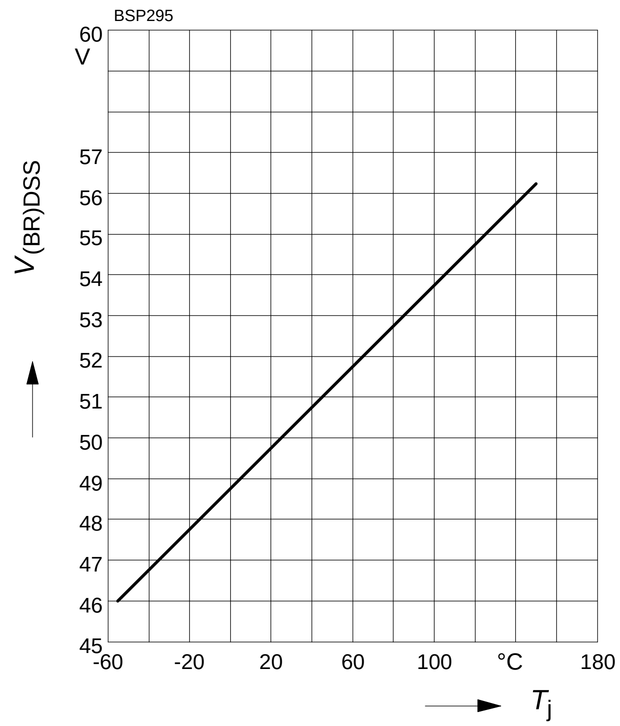
$V_{GS} = f\,(Q_G)$; parameter: V_{DS} ,

I_D = 1.8 A pulsed, T_j = 25 °C



15 Drain-source breakdown voltage

$V_{(BR)DSS} = f\,(T_j)$



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